

REMARKS/ARGUMENT

Claims 6-8, 11, 13 and 14 are pending and have been examined in the present application.

Claims 6-8 and 11 stand rejected under the judicially created doctrine of obviousness-typed double patenting over claims 6 of U.S. Patent No.: 6,376,582 to Iwata et al. In response, Applicants submit herewith a Terminal Disclaimer with respect to U.S. Patent No.: 6,376,582. Accordingly, withdrawal of this double patenting rejection is respectfully requested.

Claims 6-8, 11 and 13 stand rejected under 35 USC Section 103(a) as being unpatentable over JP 61066604 in view of U.S. Patent No.: 5,851,325 to Terada et al. Applicants respectfully traverse this rejection.

Among limitations of independent claims 6 which are neither disclosed nor suggested in the prior art of record is a method of manufacturing ligneous material wherein wood fibers which are acetylated to have a weight percent gain of 7% or greater are bound together with wood fibers which are not acetylated to obtain a resulting composite having an average degree of acetylation measured in weight percent gain of 7-18%. The binder used to bind the wood fibers contains polyisocyanate and a phenol thermosetting resin, the polyisocyanate content being 50% or greater.

A ligneous material manufactured according to the present invention by binding the wood fibers having the average acetylation degree of 7-18 weight percent using the binder having a polyisocyanate content of 50% or greater can realize an extremely low water absorption expansion rate.

For example, in Example 2 of the present invention shown in Table 1 of the specification, wood fibers having an average acetylation degree of 15 weight percent is manufactured by using a binder PMDI (Sumidur 44V-20 manufactured by Sumitomo

Bayer Urethane). The binder includes 100% polyisocyanate. As a result, a very low value of 5.0% of thickness swelling in water at 20°C was achieved in Example 2.

On the other hand, in Comparative Example 1, the ligneous material was manufactured by binding the wood fibers having an average acetylation degree of 0 weight percent using the same binder as Example 2. The thickness swelling in water at 20°C was 12.9%. Also, in Comparative Example 2 the same binder was used for wood fibers having an average acetylation degree of 5 weight percent. In Comparative Example 2, the thickness swelling in water at 20°C was 10.1%.

Therefore, according to the present invention, a ligneous material having excellent properties can be obtained when both (1) the average degree of acetylation of wood fibers in the mixture is 7-18% and (2) a binder whose polyisocyanate content is 50% or greater is used.

In contrast to the present invention, JP 61066604 discloses a method for preparing particle board by mixing acetylated wood chips with non-acetylated wood chips. In the specification of JP61066604, is described that a theoretical amount, i.e., 15-20% of the total number of hydroxyl groups present in cellulose molecules of a wood chip, is acetylated by subjecting wood chips to a predetermined acetylation process. It is also described that acetylated wood chip and un-acetylated wood chip are mixed in the amount of 1:4 to 1:1 in weight ratio. In JP 61066604, however, there is no disclosure or suggestion relating to the average acetylation degree in terms of the weight percent gain after mixing. Moreover, it is neither disclosed nor suggested in JP 61066604 that the average degree of acetylation is in the range of 7-18 weight percent.

As admitted on page 7 of the Office Action, "the percentage of acetylation OH groups is not equivalent to the percentage of weight gain." The Office Action contends, however, that since JP 61066604 discloses forming acetylation wood elements by a process similar to the presently claimed invention, and that a similar acetylating agent is used, "that the wood elements of JP 61066604 would intrinsically

be acetylated to the same degree, as measured in weight percent gain, as the presently claimed wood elements. Applicants respectfully disagree with this assertion.

In relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily arose from the teachings of the applied prior art. Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

Applicants respectfully submit that since JP 61066604 discloses the degree of acetylation in terms of the percentage of acetylated hydroxyl groups, and that the percentage acetylated hydroxyl groups is not equivalent to the percentage of weight gain, JP 61066604 cannot inherently teach an average degree of acetylation in the range of 7-18 weight percent as required by independent claim 6. There is absolutely nothing within the disclosure of JP 61066604 which would motivate one of skill in the art to arrive at a degree of acetylation measured in weight percent gain in a range of 7-18 weight percent since the percentage of acetylated hydroxyl groups described in JP 61066604 is not equivalent to the percentage weight gain. Accordingly, one of skill in the art would not arrive at the present invention defined in independent claim 6 through the teachings of JP 61066604 because there is no teaching or motivation to arrive at the claimed acetylation range.

Terada et al., does not remedy any deficiencies of JP 61066604. Terada et al., describes using a binder which includes polyisocyanate and phenol resin in a ratio of 3:1 to 1:3. In Terada et al., however, acetylation of woody fibers is not disclosed, nor use of the binder for mixed acetylated wood fibers having an average acetylation degree of 7-18 weight percent is suggested.

Therefore, even if one were to combine the teaching of JP 61066604 and Terada et al., one would not arrive at the present invention as defined in independent claim 6. At best, one would arrive at a particle board having acetylated wood chips and non-acetylated wood chips mixed together and bound, wherein acetylated wood chips having 15-20% of the total number of hydroxyl groups present in the cellulose

molecules are acetylated. As admitted on page 7 of the Office Action, the percentage of acetylated hydroxyl groups is not equivalent to the percentage of weight gain. Therefore, there is no teaching of the claimed wood fibers having an average acetylation degree of 7-18 weight percent. Accordingly, it is respectfully submitted that independent claim 6 patentably distinguishes over the art of record.

Claims 7-8, 11 and 13 depend directly from independent claim 6 and include all the limitations found therein. Each of the dependent claims include additional limitations which, in combination with the limitations of independent claim 6, are neither disclosed nor suggested in the prior art of record. Accordingly, claims 7-8, 11 and 13 are likewise patentable.

Claims 6-7, 11 and 13-14 stand rejected under 35 USC Section 103(a) as being unpatentable over JP 07124913 in view of Terada et al. Applicants respectfully traverse this rejection.

JP 07124913 describes that acetylated woody raw material (wood flake or woody fiber) and unacetylated woody raw material are prepared, and a binder resin, such as phenol resin, is separately applied to each raw material. Then, the acetylated woody raw material, the unacetylated woody raw material and the acetylated woody raw material are laminated in that order, and pressed to be formed into a plate shape. In other words, the formed wood plate has a laminate structure of an acetylated layer, an unacetylated layer and another acetylated layer. There is nothing within JP 07124913 which teaches or even remotely suggests that the acetylated woody raw material and the unacetylated woody raw material are mixed together to form a composite. In fact, in as much as JP 07124913 teaches that these materials are kept separate and in their own layers, it teaches away from the present invention as defined in independent claim 6.

As is clearly seen, there is no teaching or suggestion in JP 07124913 that the acetylated wood fibers and the unacetylated wood fibers are mixed so that the average degree of acetylation measured in weight percent gain is in the range of 7-18% as required by independent claim 6.

Terada et al., does not remedy any of the deficiencies of JP 07124913. As described above, there is nothing within Terada et al., which teaches or even remotely suggests wood fibers having an average degree of acetylation, measured in weight percent gain, of 7-18 weight percent.

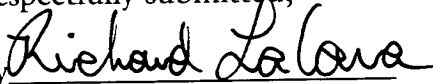
Therefore, even if one were to combine the teachings of JP 07124913 and Terada et al., one would not arrive at the present invention as defined in independent claim 6. At best, one would arrive at a laminate structure such as that disclosed in JP 07124913 wherein the acetylated wood fiber is kept separate from the unacetylated wood fiber. Accordingly, it is respectfully submitted that independent claim 6 patently distinguishes over the art of record.

Claims 7, 11 and 13-14 depend directly from independent claim 6 and include all the limitations found therein. Each of these dependent claims include additional limitation which, in combination with the limitations of independent claim 6, are neither disclosed nor suggested in prior art of record. Accordingly, claim 7, 11 and 13-14 are likewise patentable.

In view of the foregoing, reconsideration of the rejection of claims 6-8, 11 and 13-14, and allowance of the present application with claims 6-8, 11 and 13-14 is respectfully and earnestly solicited.

Dated: October 14, 2003

Respectfully submitted,

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